Agilent L4490A/91A RF Switch Platform

Data Sheet

Shorten your custom switch matrix development time with a robust, reliable solution

Features

- **Flexible and easily configurable switch mounting system for robust and reliable signal routing**
- **3D models included for quick RF cable layout and documentation**
- **Graphical Web interface for quick setup, troubleshooting and support**
- **Easy connection and control of all the most popular microwave switches and attenuators**
- **Expandable up to 128 coil drives**
- **Effective switch management with switch verification, sequences and relay counter**
- **Software drivers for most common programming environments**
- **LXI compliance includes Web interface and built-in Ethernet connectivity**

The Agilent Technologies L4490A/91A RF switch platform simplifies the task of defining and building a custom switch matrix. Engineers are often under pressure to lower cost and get to market quickly. The L4490A/91A provides the right tools to easily define and build a custom switch matrix while reducing your overall design time – all without sacrificing signal integrity. In addition, with the robust design, you can have confidence in the reliability and longevity of your system.

The RF switch platform easily integrates into your test environment with standard rack mount kits, LAN and GPIB connectivity, graphical Web interface and software drivers for the most common programming environments.

This platform is ideal for R&D and manufacturing engineers creating custom switch matrices for A/D and wireless applications testing mobile radios, handsets, basestations, radio components, and other wireless devices. Also, with the broad range of supported switches up to 50 GHz, you can future-proof your investment for emerging standards like WiMAX™, LTE and UMB.

Build custom designs from multiplexers, blocking or non-blocking matrices or a combination of both with signal conditioning to meet your unique needs.

Two Platforms with Ample Space to Mount Switches and Other Components

2U and 4U high versions of the switch platform are available to give you flexibility for your unique needs and expandability for future projects. Both platforms come standard with 64 coil drives integrated into the enclose with options for expansion.

The 2U version uses a bottom mounting tray with pre-drilled holes for mounting up to 8 multiport switches or a combination of devices using optional bracket kits. See Figure 1.

The 4U version has a unique switch mounting system with a robust design ensuring that all components are securely mounted, giving you confidence in a highly accurate and repeatable RF connection.

The 4U switch mounting system comes standard with a tray for vertically mounting switches and attenuators using optional bracket kits. All devices are securely mounted with the RF connectors on top, giving you a compact, flexible solution to meet your custom needs.

The switch mounting tray has plenty of space for mounting and controlling up to 48 SPDT switches or 16 multiport switches, or a combination of these and other devices. Note that some complex switch configurations require more than the supplied 600 mA quiescent current. See quiescent current calculations in the specifications section for more information. Another mounting tray at the rear of the instrument provides space for mounting additional components. There is also an optional front panel with locations for mounting up to 8 mulitport switches. See Figure 2.

The 4U unit also has a location on the rear panel to mount a user-provided fan for when cooling is required.

The design also provides easy access for building, customizing and servicing the unit. You can easily remove the top, bottom, front and rear panels for quick access. The front and rear panels can be customized for your unique needs. You can drill or punch holes for mounting RF connectors, LEDs and other signal routing components. See figure 3.

Cables and connectors can be ordered through Agilent Technologies or third party suppliers listed later in this document under ordering information.

Switch drive controller
Pre-drilled bottom plate for mounting RF switches and other components
Place up to 4 distribution boards here for easy control of switches and attenuators
Customizable rear panel for RF connectors
Lan and GPIB control
Agilent Technologies
L4490A
RF Switch Platform
LXI
Power and LED status indicators
Customizable two-layer front panel

Figure 1. L4490A RF switch platform

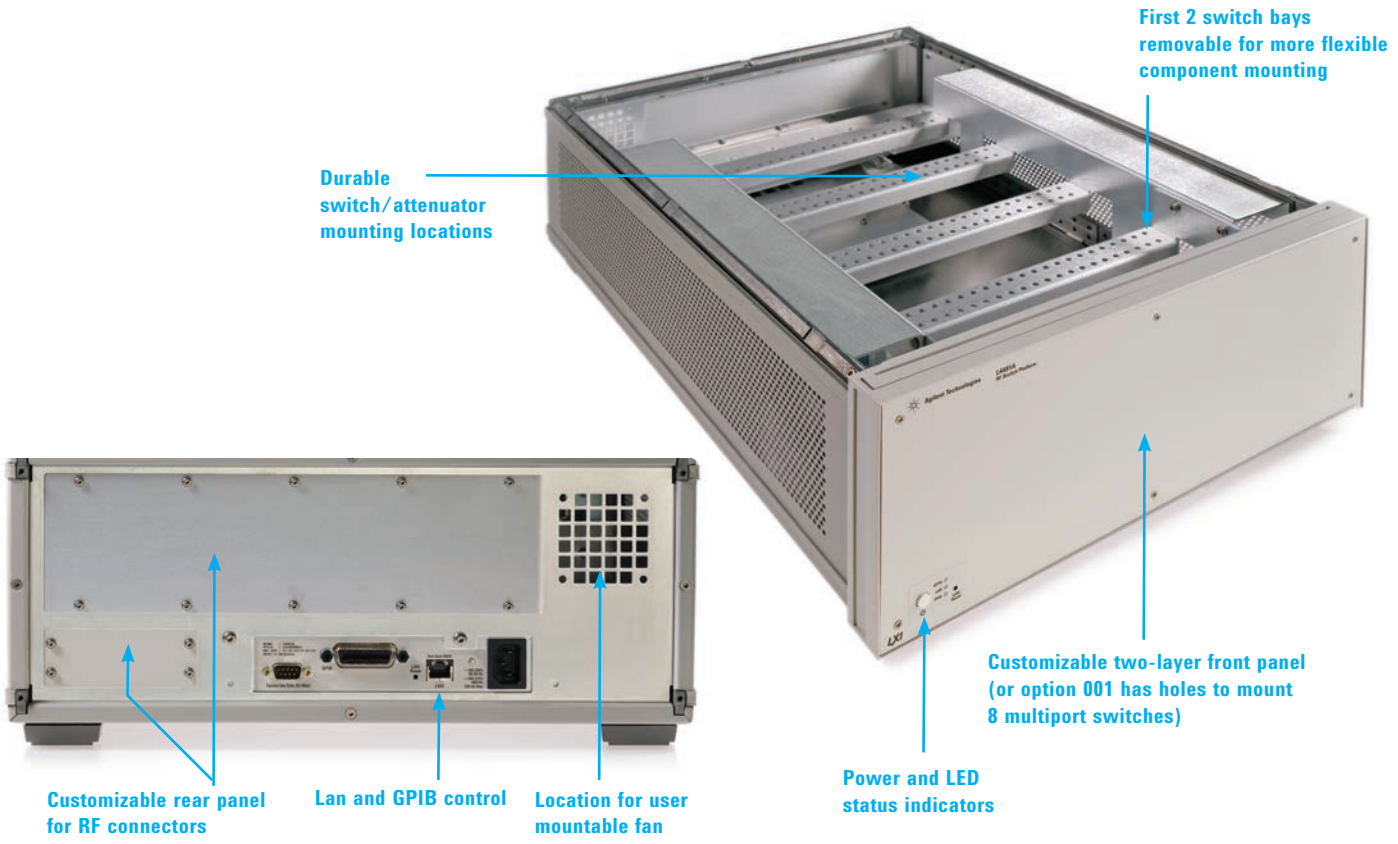


Figure 2. L4491A RF switch platform

Figure 3. User configured L4491A RF switch platform

For even more time savings 2D and 3D models of the switch mounting system, switches and brackets are provided in .dxf, .stp and .igs formats. This enables you to quickly layout cable routing and document your solution in your own modeling tools. See Figure 4.

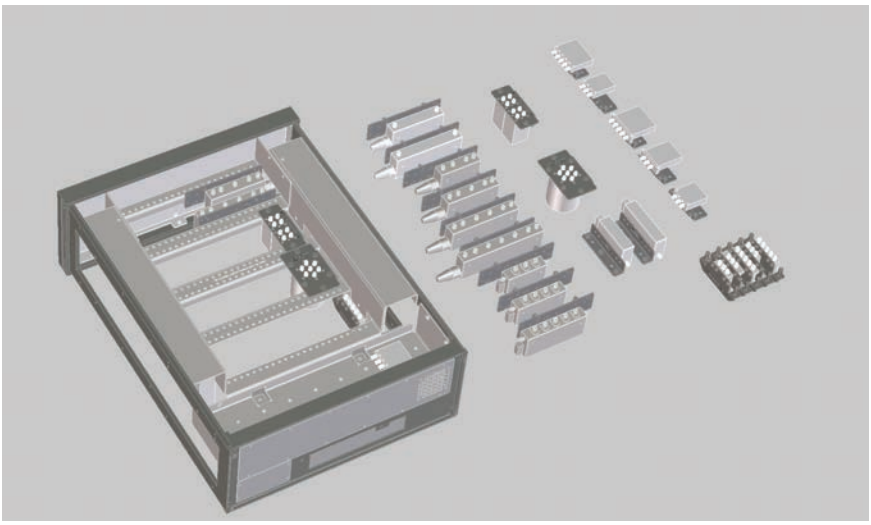


Figure 4: 3D models

Easy Servicability

With the switch mounting system, switches are easily replaced through the bottom of the box without disturbing the RF cabling. See Figure 5.

Switch drive and readback capabilities

The Agilent L4490A/91A integrates the power and control signals for all of the most popular RF and uW switches and attenuators. It comes standard with 64 switch coil drive lines – that's enough to control 32 standard SPDT switches or 8 multiport switches. With Option 002, it's expandable to control another 64 coils. In addition, access to the 5 V, 12 V and 24 V supplies is also available to control other devices in your RF switch matrix. If you need more control and monitoring lines, Option 004 adds 16 digital IO lines and 28 additional relay drive lines.

The L4490A/91A uses distribution boards for simple connections to the switches using standard ribbon cables.

The distribution boards also have digital inputs so you can read back the actual position of the switch, giving you more confidence in switch closures. Use digital outputs to drive LEDs to show the actual switch position.

Supported components

The following Agilent microwave switches and attenuators are directly supported with the Y1150A-Y1155A distribution boards:

- N181x/U9397x Series SPDT switches
- 8762/3/4 Series SPDT switches
- 8765x coaxial switches
- 8766x/8767x/8768x multiport switches
- 87104x/106x/L710xx/L720xx multiport switches
- 87406x Series matrix switches
- 87204x/206x Series multiport switches
- 87606x Series matrix switches
- 87222x/L7222 transfer switches
- 849x/8490x Series attenuators
- Other switches and devices through individual screw terminal connections

The Y1156A diagnostics board tests the L4490A/91A to ensure all the control signals are being delivered to the switches. This test is easily done using the switch sequences supplied through the Web interface.

Figure 5: Easy to service the unit without disturbing the RF cabling

Switch Management

Switch sequences allow you to define and control complex signal paths with user assigned names. Sequences can be nested and called from your program. Up to 500 sequences can be defined and stored in non-volatile memory so when power is lost, the sequences are not. Use sequences and the break-before-make features to ensure switch closures are made in the right order and eliminate possible damage to your valuable DUTs or test equipment. See Figure 6.

Switch counts are also stored in the instrument's non-volatile memory. So you can monitor when a a switch is nearing its end-of-life.

Additionally, power up/down states can be identified and stored in non-volatile memory, protecting the DUT when power is lost.

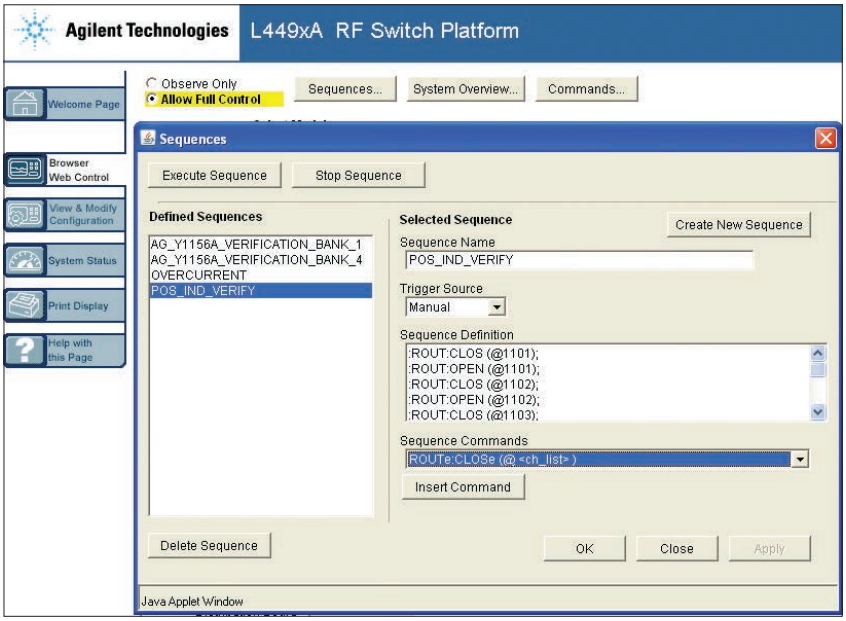


Figure 6: L4490A/91A switch sequences developed/executed from the Web interface or programming environment

Graphical Web Interface

The built-in graphical Web browser interface provides remote access and control of the instrument via a Java-enabled browser such as Internet Explorer. Using the Web interface, you can set-up, troubleshoot and maintain your instrument from anywhere on the network. See Figure 7.

- View and modify instrument setup
- Configure switch/attenuator channels
- Open or close switches
- Send, receive and view SCPI commands
- Define and execute switch sequences

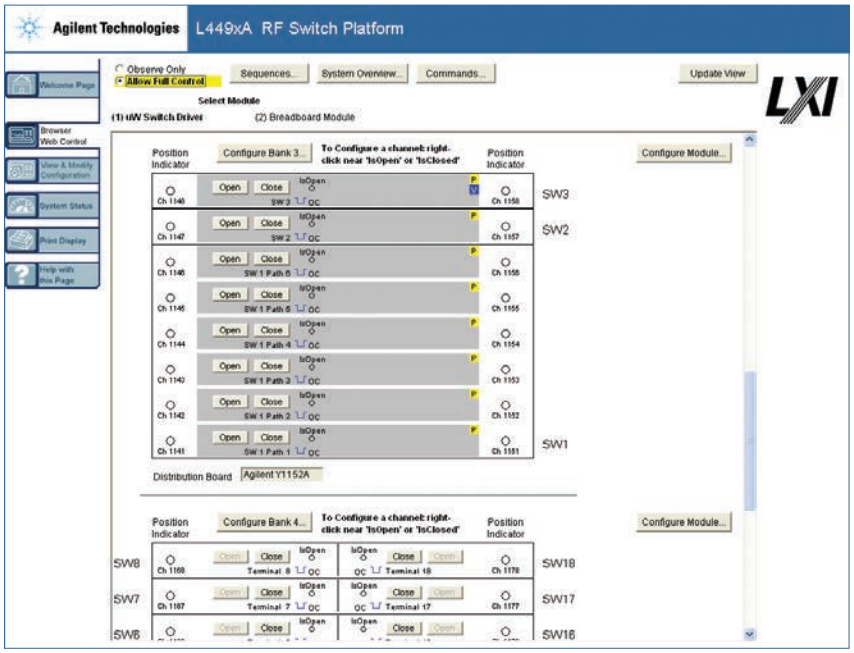


Figure 7. The Web interface makes it easy to set up, troubleshoot and maintain your test remotely.

- View error queue
- Get status reports on relay cycle counts, firmware revisions and more

Additionally, since the Web server is built into the instrument, you can access it on any operating system that supports the Web browser without having to install any special software. Password protection and LAN lockout are also provided for additional security.

Standard Ethernet connectivity with LXI

The L4490A/91A ships with the Agilent E2094 Libraries Suite for easy configuration and integration into your system.

Each unit comes standard with built-in GPIB and Ethernet connectivity. The 100BaseT Ethernet interface offers high-speed connections that allow for remote access and control. You can set up a private network to filter out unwanted LAN traffic and speed up the I/O throughput, or take advantage of the remote capabilities and distribute your tests worldwide. Monitor, troubleshoot or debug your application remotely.

Software for most popular programming environments

Full support for standard programming environments ensures compatibility and efficiency. The L4490A/91A supports the SCPI language and is software compatible with the L4445A and 34945A uW switch drivers. You can use direct I/O with the software you already have and know, or use standard IVI and LabVIEW* software drivers that provide compatibility with the most popular development environments including:

- Agilent VEE PRO
- National Instruments LabVIEW, LabWindows/CVI, TestStand, and Switch Manager
- Microsoft C/C++ and Visual Basic

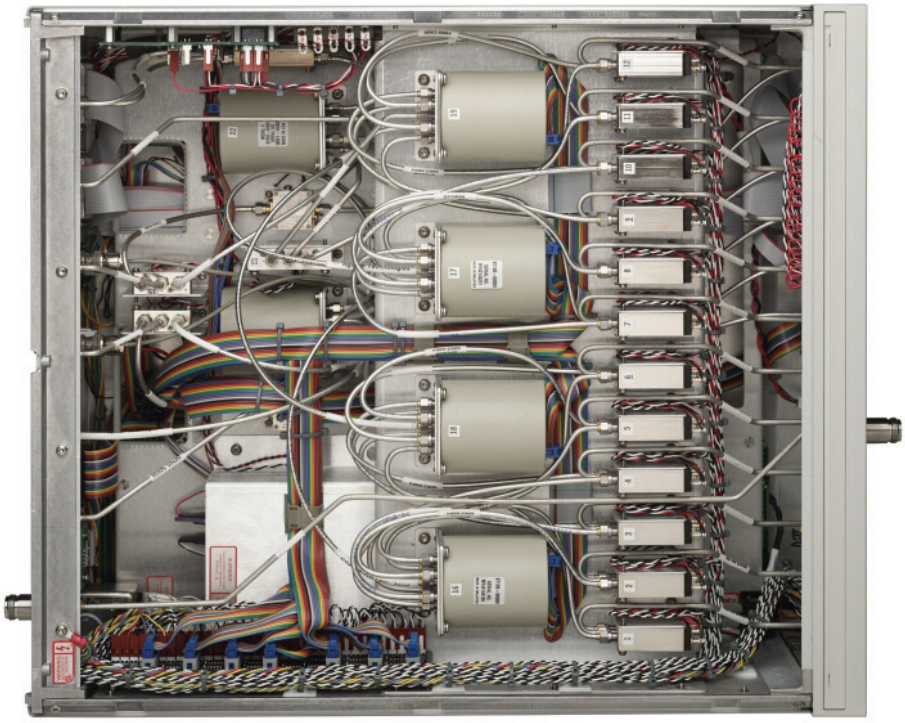


Figure 8. Agilent custom solutions are fully integrated, tested and documented

Custom solutions

Agilent also offers turnkey switch matrix designs that range from a simple 1 x 12 fanout to a full 10 x 10 non-blocking, full access matrix, to complete custom switching and signal conditioning units based on your requirements. These products are completely assembled and offer high performance, and high reliability with Agilent RF switches or other specified components. The high-quality, semi-rigid coaxial cables ensure excellent signal integrity. These systems are also fully tested with S-parameters on every signal path and include full documentation and support.

*LabVIEW is a National Instruments product.

Product Specifications

Switch drive

	64 channels, low side drive mode	Driver off voltage (max)	30 V
		Driver off leakage current	500 uA
		Driver on current (max)	600 mA
		Driver on voltage (max)	0.5 V at 600 mA
	64 channels, TTL drive mode	Hi output voltage	3 V at Iout = 2 mA
		Lo output voltage	0.4 V at Iin = 20 mA
		Lo input current	20 mA

Position indicator sense inputs

Channels	64
Lo input voltage (max)	0.8 V
Hi input voltage (min)	2.5 V
Input resistance	>100 kΩ at Vin ≤ 5 V >20 kΩ at Vin > 5 V
Maximum input voltage	30 V

Switch drive power supply

Voltage	24 V nominal (external power supply required for switches needing different voltages)
Current	600 mA (typical 700 mA; 500 mA quiescent + 200 mA for switching)

Quiescent Current Requirement

Most latching switches require some small amount of quiescent current to remain in their position. This current can range from 1 to 2 mA to 50 mA. Multiport switches nominal quiescent currents range from 20 mA to 40 mA. Be sure to calculate your quiescent current needs using the 5989-2272EN Configuration Guide.

Example:

12 87106C nominal quiescent current: 12 x 30 ma = 360 mA

Plus 6 N1810TL nominal quiescent current: 6 x 1.5 ma = 9 ma

Total nominal quiescent current = 369 mA

External power connection

Voltage range	4.75 V to 30 V
Current limit	2 A

LED indicator (current mode divers)

Channels	64
Supply voltage	5 V nominal
LED drive current	5 mA nominal (prog 1-20 mA)
Driver compliance voltage	0.8 V

Memory

States	5 instrument states with user label in non-volatile memory

Product specifications (continued)

General specifications

Power supply and line frequency	100 V to 240 V ±10% (50-60 Hz ±10% auto sensed)
Power consumption	100/200 VA
Operating Environment	Full accuracy for 0°C to 55°C Full accuracy to 80% R.H. at 40°C
Storage environment	40°C to 70°C
2U Dimensions (H x W x L)	88.1 x 425.6 x 574.0 mm 3.47 x 16.76 x 22.60 in
2U Weight	7.7 kg (17 lbs)
4U Dimensions (H x W x L)	177.0 x 425.6 x 574.0 mm 6.97 x 16.76 x 22.60 in
4U Weight	9.1 kg (20 lbs)
Safety conforms to	CSA, UL/IEC/EN 61010-1
EMC conforms to	IEC/EN 61326-1, CISPR 11
Warranty	1 year

Additional power

+5 V	1 A
+12 V	3 A (3 A fused)
+24 V	0.6 A
Total max power: [1]	35 W at 40 °C (L4490A) 40 W at 40 °C (L4491A) Derated linearly to 10 W at 55°C (L4490A and L4491A)

Digital IO Option 004

16 digital IO lines plus 28 relay drive lines

Max module power dissipation

6 W

Power available

12 V regulation no load to full load	10%
5 V regulation no load to full load	5%
Max power from 12 V	6 W
Max power from 5 V	1 W

28 relay drives	sink up to 100 mA
GPIO ports chan 1 and chan 2	8 configure bits as input or output
chan 3	3 output bits

1. If additional power is required to drive relays, use an external power supply.

Product specifications (continued)

Software

Agilent connectivity software included	Agilent I0 Libraries Suite 15 or greater (E2094N)

Minimum system requirements

PC hardware	Intel Pentium 100 MHz, 64 Mbyte RAM, 210 Mbyte disk space Display 800x600, 256 colors, CD-ROM drive
Operating system[1]	Windows® NT/2000/XP/Vista

Software driver support for programming languages

Software drivers	IVI-C and IVI-COM for Windows NT®/2000/XP/Vista LabVIEW	
Compatible with programming tools and environments		
	Agilent	VEE Pro
	National Instruments	TestStand Measurement Studio LabWindows/CVI LabVIEW Switch Executive
	Microsoft	Visual Studio.NET C/C++ Visual Basic 6

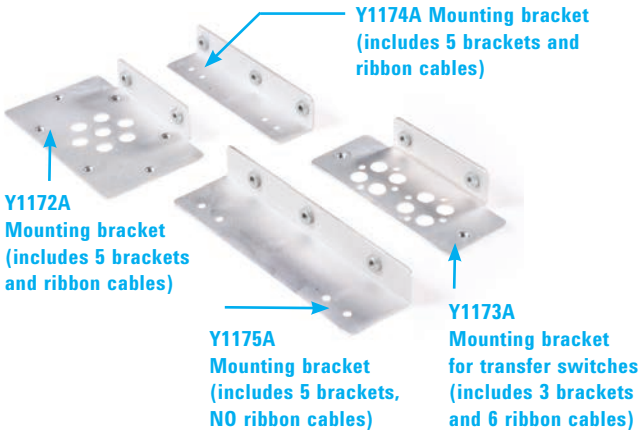
[1] Load IO Libraries Version M for Windows NT support or version 14.0 for Windows 98 SE support

Table 1 Ordering information

	Description	Comments
L4490A	2U RF switch platform	Includes switch driver and space to mount RF components. Comes standard with LAN and GPIB interface. User's guide is included on CD.
OPT 004	Add 16 bit digital IO and 28 bits of relay drive lines	Recommended for DIO control
L4491A	4U RF switch platform	Includes switch driver and space to mount RF components. Comes standard with LAN and GPIB interface. User's guide is included on CD.
OPT 001	Front panel with holes to mount up to 8 Agilent 87xxx or L7xxx style multiport switches	Replaces STD blank front panel with a front panel with holes for mounting multiport switches.
OPT 002	Add 64 additional switch drive lines with additional 34945EXT	Required if you have more than 4 distribution boards.
OPT 004	Add 16 bit digital IO and 28 bits of relay drive lines	Recommended for DIO control
OPT 005	Standard 4U unit with center tray for mounting switches	Recommended for RF switch mounting configurations
OPT 006	4U unit with bottom mounting tray (pre-drilled bottom for mounting switches and no center switch tray)	Replaces center tray mounting option 005 with no center tray and mounting holes on bottom of the unit.
Accessories	**Distribution boards -** Required for control of external switches. See Table 2 to determine correct distribution boards needed.	
Y1150A	Distribution board for 8 N181x/U9397x SPDT switches	
Y1151A	Distribution board for two 87104x/106x/L7x0xx multiport or 87406B matrix switches	
Y1152A	Distribution board for one 87204x/206x or 87606B switch and two N181x switches	
Y1153A	Distribution board for two 84904/5/6/7/8 or 8494/5/6 step attenuators	
Y1154A	Distribution board for two 87222/L7222C transfer switches and six N181x SPDT switches	
Y1155A	Distribution board w/ generic screw terminals for driving 16 switch coils	
Y1156A	Diagnostics board to verify switch control signals	Recommended for troubleshooting purposes
	Mounting kits: includes brackets, screws and ribbon cables where appropriate	
Y1170A	Mounting brackets and ribbon cables for mounting qty 5 N181x or 8762/3/4 Series switches in the L4491A	Can mount 12 SPDT switches per bay (up to 48 SPDT switches in switch tray). Ribbon cables only support N1810 series switches.
Y1171A	Mounting brackets and ribbon cables for mounting qty 5 N181x or 8762/3/4 Series switches in the L4490A	Can mount up to 8 SPDT switches. Ribbon cables only support N1810 series switches.
Y1172A	Mounting brackets and ribbon cables for mounting qty 5 87xxx or L7xxx multiport/matrix switches in the L4490A/91A	Can mount 4 multiport/matrix switches per bay in the L4491A (up to 16 total) and up to 8 multiports in the L4490A.
Y1173A	Mounting brackets and ribbon cables for mounting qty 6 87222 series transfer switches in the L4490A/91A (3 brackets and 6 cables)	Can mount up to 12 transfer switches per bay in the L4491A. Recommend right angle RF cable when used in the L4490A due to height restrictions.
Y1174A	Mounting brackets and ribbon cables for mounting qty 5 849xx Series step attenuators in the L4490A/91A	Can mount up to 4 attenuators per bay in the L4491A.
Y1175A	Mounting brackets for mounting qty 5 849x series attenuators or 876x Series switches in the L4490/91A	Can mount up to 4 attenuators per bay in the L4491A. NO ribbon cables included.

Table 1 Ordering information (continued)

	Description	Comments
	Replacement mechanical parts	
L4490-06101	Extra bottom/top mounting tray with pre-drilled mounting holes for mounting switches	Same tray as used in L4490A and L4491A Option 006
L4490-80000	Extra L4490A dual layer front panel	Same front panel as L4491A standard front panel
L4490-80001	Extra L4491A dual layer front panel	Same front panel as L4491A standard front panel
L4490-80002	Extra L4491A dual layer front panel with holes to mount up to 8 Agilent 87xxx or L7xxx style multiport switches	Same front panel as L4491A Option 001
L4490-06213	Extra L4491A rear filler panel Includes fan holes for 60 mm fan (50 mm mounting hole to hole spacing)	Same rear filler panel as on the standard L4491A
L4490-06120	Extra L4490A/L4491A small rear panel	Filler panel
	Rackmount kits See enclosures catalog for more rack mounting options	
L4490A-AXA or 5063-9212	Standard rackmount flange kit for 2U product	
L4490A-AXB or 5063-9219	Standard rackmount kit with handles for 2U	
L4491A-AXA or 5063-9215	Standard rackmount flange kit for 4U product	
L4491A-AXB or 5063-9222	Standard rackmount kit with handles for 4U	
	Cables and connectors	
Agilent	cables: **www.agilent.com/find/cables** connectors: **www.agilent.com/find/connectors**	
Third party	Pasternack **www.pasternack.com** Micro-coax **www.micro-coax.com** S. M. Electronics **www.smelectronics.us**	


Y1174A Mounting bracket (includes 5 brackets and ribbon cables)
Y1172A Mounting bracket (includes 5 brackets and ribbon cables)
Y1175A Mounting bracket (includes 5 brackets, NO ribbon cables)
Y1173A Mounting bracket for transfer switches (includes 3 brackets and 6 ribbon cables)

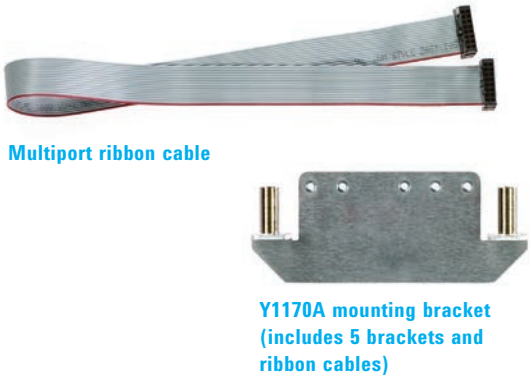


Figure 7. L4490A/91A RF switch mounting brackets

Custom Matrix from Agilent's Custom Group

Configuration and pricing depends on the defined configuration. See **www.agilent.com/find/switchmatrix** to find out more.

Example configuration:

A test system is being built that requires the following microwave switching:

- (Qty 6) Agilent 87206B SP6T switches
- (Qty 8) Agilent N1810UL SPDT switches

Step 1 Select the required quantity of distribution boards for the required switches using Table 2:

- (Qty 6) Y1152A distribution boards to control (Qty 6) 87206B switches
- (Qty 1) Y1150A distribution board to control (Qty 8) N1810UL switches

Step 2 Select switch mounting kits based on switches selected:

- (Qty 2) Y1172A mounting kits to mount (Qty 6) 87206B switches
- (Qty 2) Y1170A mounting kits to mount (Qty 8) N1810UL switches

Step 3 Select the RF Platform and options. For 14 switches, the L4491A is recommended. If more than 4 distribution boards are needed, then you need to add Option 002.

Here is the final recommended configuration:

- (Qty 6) 87206B DC-20 GHz SP6T switches with option 161 (Qty 6) Y1152A distribution boards (Qty 2) Y1172A mounting brackets plus ribbon cables
- (Qty 8) N1810UL DC-20 GHz SPDT switches with options 124, 402, 201 (Qty 1) Y1150A distribution board (Qty 2) Y1170A mounting brackets plus ribbon cables
- L4491A w/option 002 for an additional 64 control lines

See table 2 for recommended switch options for 24 VDC coils, position indicators and DIP socket connectors.

See the application note: *Agilent 34945A, L4445A & L4490A/L4491A Configuration Guide* (5989-2272EN) for additional configuration details.

Table 2. Accessory selection: Use the following table to select distribution boards, mounting brackets and switch options.

Switch model	Description	Frequency range	Reference document number[1]	Coil voltage option	Position indicator option	DC connector option	Distribution board [No. of switches/ board]	Bracket kit[3]
N1810UL N1810TL N1811TL N1812UL	Un-terminated latching 3-port (SPDT) Terminated latching 3-port (SPDT) Terminated latching 4-port (bypass) Un-terminated latching 5-port	DC – 2, 4, 20, or 26.5 GHz	5968-9653E	124	402/403[2]	201 (DB9F)	Y1150A [8] Y1152A [2] Y1154A [6]	Y1170A: L4491A Y1171A: L4490A
87104A 87104B 87104C 87106A 87106B 87106C 87406B	SP4T 4-port latching, terminated SP4T 4-port latching, terminated SP4T 4-port latching, terminated SP6T 6-port latching, terminated SP6T 6-port latching, terminated SP6T 6-port latching, terminated 6-port matrix, terminated	DC – 4 GHz DC – 20 GHz DC – 26.5 GHz DC – 4 GHz DC – 20 GHz DC – 26.5 GHz DC – 20 GHz	5091-3366E 5965-7841E	024	Included	161 (16-pin DIP)	Y1151A [2]	Y1172A
87204A 87204B 87204C 87206A 87206B 87206C 87606B	SP4T 4-port latching, terminated SP4T 4-port latching, terminated SP4T 4-port latching, terminated SP6T 6-port latching, terminated SP6T 6-port latching, terminated SP6T 6-port latching, terminated 6-port matrix, terminated	DC – 4 GHz DC – 20 GHz DC – 26.5 GHz DC – 4 GHz DC – 20 GHz DC – 26.5 GHz DC – 20 GHz	5965-3309E 5965-7842E	Included	Included	161 (16-pin DIP)	Y1152A [1]	Y1172A
87222C 87222D 87222E	4-port transfer	DC – 26.5 GHz DC – 40 GHz DC – 50 GHz	5968-2216E	Included	Included	161 (16-pin DIP)	Y1154A [2]	Y1173A
L7104A L7104B L7104C L7106A L7106B L7106C L7204A L7204B L7204C L7206A L7206B L7206C	SP4T 4-port latching, terminated SP4T 4-port latching, terminated SP4T 4-port latching, terminated SP6T 6-port latching, terminated SP6T 6-port latching, terminated SP6T 6-port latching, terminated SP4T 4-port latching, un-terminated SP4T 4-port latching, un-terminated SP4T 4-port latching, un-terminated SP6T 6-port latching, un-terminated SP6T 6-port latching, un-terminated SP6T 6-port latching, un-terminated	DC – 4 GHz DC – 20 GHz DC – 26.5 GHz DC – 4 GHz DC – 20 GHz DC – 26.5 GHz DC – 4 GHz DC – 20 GHz DC – 26.5 GHz DC – 4 GHz DC – 20 GHz DC – 26.5 GHz	5989-6030EN	024	Included	161 (16-pin DIP)	Y1151A [2]	Y1172A

1 Product and technical overviews for the switches and attenuators listed can be obtained by document number from the Agilent RF & Microwave Test Accessories web site. Go to **http://www.agilent.com/find/accessories**, select *'RF & Microwave Test Accessories,'* and search for the document number. Additional information can also be found in the *'RF and Microwave Test Accessories Catalog'* accessible from this site. If viewing this document on-line, click on the reference document link.

2 Drive Option 403 adds current interrupts which allow continuous drive mode to be used within the 34945A/L4445A/L4490A/L4491A.

3 Bracket kits apply to the L4490A and L4491A. These kits include pre-assembled control cables and hardware for mounting switches/attenuators to the brackets and the bracket assemblies to the L4490A and L4491A RF Switch Platforms.

Table 2. Accessory selection: Use the following table to select distribution boards, mounting brackets and switch options (continued).

Switch model	Description	Frequency range	Reference document number[1]	Coil voltage option	Position indicator option	DC connector option	Distribution board [No. of switches/ board]	Bracket kit[3]
L7222C	4-port transfer latching, terminated	DC – 26.5 GHz	5989-6084EN	included	included	161 (16-pin DIP)	Y1154A [2]	Y1173A
8762A	Terminated latching 3-port (SPDT)	DC – 4 GHz	5952-1873E	024	n/a	Solder terminals (standard)	Y1155A [8]	Y1170A: L4491A Y1171A: L4490A
8762B	Terminated latching 3-port (SPDT)	DC – 18 GHz						
8762C	Terminated latching 3-port (SPDT)	DC – 26.5 GHz						
8763A	Terminated latching 4-port (transfer)	DC – 4 GHz						
8763B	Terminated latching 4-port (transfer)	DC – 18 GHz						
8763C	Terminated latching 4-port (transfer)	DC – 26.5 GHz						
8764A	Terminated latching 5-port	DC – 4 GHz						
8764B	Terminated latching 5-port	DC – 18 GHz						
8764C	Terminated latching 5-port	DC – 26.5 GHz						
8762F	75 ohms Terminated (SPDT)	DC – 4 GHz	5964-3704E					
8765A	Coaxial (SPDT), SMA	DC – 4 GHz	5952-2231E	324	n/a	Solder terminals (with 324)	Y1155A [8]	Y1170A: L4491A Y1171A: L4490A
8765B	Coaxial (SPDT), SMA	DC – 20 GHz						
8765C	Coaxial (SPDT), 3.5 mm	DC – 26.5 GHz						
8765D	Coaxial (SPDT), 2.4 mm	DC – 40 GHz						
8765F	Coaxial (SPDT), 75 ohm, SMB	DC – 4 GHz	5091-2679E					
8766K	Coaxial (SP3T)	DC – 26.5 GHz	5959-7831	024	n/a	060 (12-pin Viking)	Y1155A [2] Y1155A [1]	Y1175A
8767K	Coaxial (SP4T)	DC – 26.5 GHz						
8768K	Coaxial (SP5T)	DC – 26.5 GHz						
8769K	Coaxial (SP6T)	DC – 26.5 GHz						
8767M	Coaxial (SP4T)	DC – 50 GHz	5988-2477EN	024	n/a	10-pin DIP	Y1153A [2]	Y1175A
8768M	Coaxial (SP5T)	DC – 50 GHz						
8769M	Coaxial (SP6T)	DC – 50 GHz						
U9397A	8 GHz Solid State	300 kHz-8 GHz	5989-6088EN	Included	n/a	Solder terminals	Y1155A [8]	Y1170A: L4491A Y1171A: L4490A
U9397C	18 GHz Solid State	300 kHz–18 GHz						

1 Product and technical overviews for the switches and attenuators listed can be obtained by document number from the Agilent RF & Microwave Test Accessories web site. Go to **http://www.agilent.com/find/accessories**, select *'RF & Microwave Test Accessories,'* and search for the document number. Additional information can also be found in the *'RF and Microwave Test Accessories Catalog'* accessible from this site. If viewing this document on-line, click on the reference document link.

2 Drive Option 403 adds current interrupts which allow continuous drive mode to be used within the 34945A/L4445A/L4490A/L4491A.

3 Bracket kits apply to the L4490A and L4491A. These kits include pre-assembled control cables and hardware for mounting switches/attenuators to the brackets and the bracket assemblies to the L4490A and L4491A RF Switch Platforms.

Table 2. Accessory selection: Use the following table to select distribution boards, mounting brackets and switch options (continued).

Switch model	Description	Frequency range	Reference document number[1]	Coil voltage option	Position indicator option	DC connector option	Distribution board [No. of switches/ board]	Bracket kit[3]
84904K 84904L	11 dB max, 1 dB steps, 4 sections	DC – 26.5 GHz DC – 40 GHz	5963-6944	24 V (standard)	Included	10-pin DIP (standard)	Y1153A [2]	Y1174A
84906K 84906L	90 dB max, 10 dB steps, 4 sections	DC – 26.5 GHz DC – 40 GHz						
84907K 84907L	70 dB max, 10 dB steps, 3 sections	DC – 26.5 GHz DC – 40 GHz						
84904M 84905M 84908M	11 dB max, 1 dB steps, 4 sections 60 dB max, 10 dB steps, 3 sections 65 dB max, 5 dB steps, 4 sections	DC – 50 GHz	5988-2475EN	024	Included	10-pin DIP (standard)	Y1153A [2]	Y1174A
8494G 8494H	11 dB max, 1 dB steps, 4 sections	DC – 4 GHz DC – 18 GHz	4	24 V (standard)	Included	12-pin Viking (standard)	Y1153A [2]	Y1175A
8495G 8495H	70 dB max, 10 dB steps, 3 sections	DC – 4 GHz DC – 18 GHz						
8496G 8496H	110 dB max, 10 dB steps, 4 sections	DC – 4 GHz DC – 18 GHz						
8495K	70 dB max, 10 dB steps, 4 sections	DC – 26.5 GHz						
8497K	90 dB max, 10 dB steps, 4 sections	DC – 26.5 GHz						

1 Product and technical overviews for the switches and attenuators listed can be obtained by document number from the Agilent RF & Microwave Test Accessories web site. Go to **http://www.agilent.com/find/accessories**, select *'RF & Microwave Test Accessories,'* and search for the document number. Additional information can also be found in the *'RF and Microwave Test Accessories Catalog'* accessible from this site. If viewing this document on-line, click on the reference document link.

2 Drive Option 403 adds current interrupts which allow continuous drive mode to be used within the 34945A/L4445A/L4490A/L4491A.

3 Bracket kits apply to the L4490A and L4491A. These kits include pre-assembled control cables and hardware for mounting switches/attenuators to the brackets and the bracket assemblies to the L4490A and L4491A RF Switch Platforms.

4 Information on these attenuators plus additional information on other attenuators can be found in the latest version of the *'RF and Microwave Test Accessories Catalog.'*

Related Agilent Literature

Data sheets

Agilent E2094N
IO Libraries Suite 15
5989-1439EN

Agilent 34945A, L4445A,
and L4490A/L4491A
Configuration Guide
5989-2272EN

RF and Microwave
Test Accessories Catalog
5968-4314EN

Rack Enclosures
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5980-0450E

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Spain	34 (91) 631 3300
Sweden	0200-88 22 55
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